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TELESCOPIC SPECTACLES

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AT the Annual Meeting of The British Medical Association, 1928, a short paper was read on the subject of "Telescopic Spectacles." A brief history of their development was given, together with some notes on their general construction and use. Apart from particulars useful for the surgeon and dispensing optician when prescribing and fitting, very little attention was given to the question of design. Nothing was said with regard to the many difficult problems confronting the designer. For many years, although the advantages of magnifying spectacles had been fully realised and Galilean telescopes had often been tried, very little success had been achieved, largely owing to the poor quality of the image due to excessive aberrations. Some small success had certainly been obtained with spectacles for high myopia, but those for emmetropia and hypermetropia had been so inferior that surgeons had ceased to consider the possibility of their use, and the spectacles were only recommended for cases of excessive myopia with macular impairment. A further cause of failure was doubtless due to bad fitting and the use of insufficiently rigid frames.

In recent years telescopic spectacles have begun to gain favour and reputation, largely owing to the renewed efforts of opticians to produce a spectacle of real practical value. And in this country

much of the experimental work was done by Messrs. Theodore Hamblin, Ltd. Recent developments in the making of optical glasses have assisted these efforts very considerably. In this paper it is hoped to give some idea of the numerous problems which have had to be faced.

It is necessary, first of all, to realise what purpose may be served by the spectacles and the consequent requirements to be met. If well made they should be beneficial to several classes of patients: —those with defects of the retina due to excessive myopia; others who, though approximately emmetropic, have poor vision, due for instance, to partial opacity of the cornea or crystalline lens as in incipient cataract, or to a feebleness of the retina in responding to stimulation by light. All such patients should benefit by the magnified image since it covers a greater area of the retina thus stimulating more rods and cones. Further, these spectacles should be of service to patients with local areas of partial or complete choroidal atrophy. The image of an external object formed by the unaided eye might fall entirely within an insensitive area of the retina and therefore would not be seen at all. The image of that same external object seen through magnifying spectacles would cover a larger area of retina; this image might extend over an area greater than the atrophied region, and the existence of the object will in this case at least be realised, even if not clearly depicted over its whole extent.

In recent years surgeons themselves have made very successful use of these spectacles for operating or close inspection work. They give an enlarged stereoscopic image at any working distance required and leave the hands quite free. Further they can be combined with ordinary distance or bifocal spectacles, so that the wearer may be able to use the magnifying spectacles at will without making any change in his equipment. To do this is frequently a great advantage. If binocular loupes are used, the field is restricted and it is impossible to see into the distance without removing them. Using a monocular loupe, a surgeon is free to use one eye for normal vision and the other for close work, but he loses the advantages of stereoscopic vision. When telescopic units are fitted into his ordinary spectacles he has only to turn his head a little to change from vision through magnifying telescopic spectacles to normal vision. Any ametropia of the surgeon, of course, is corrected in the telescopic spectacles. This use for telescopic spectacles was quite impossible in the days when only the myopic form could be made to give an image that was good enough to confer any benefit which should be derived from the magnification.

This brief consideration of the possible uses of telescopic spectacles renders the requirements fairly evident. There are

numerous factors, both human and optical, which have to be borne in mind: the spectacles may have to be worn constantly. It is therefore most important that they should be comfortable and convenient to wear; they must not, for instance, attain the bulk or weight of even the most delicate opera glasses. Also it is desirable that they should present a pleasing appearance. They must give an erect image of course; inverted images would be quite useless. Further, they must give a large, tolerably flat and well-defined field, so that the wearer does not feel seriously restricted in his outlook. A small field would be uncomfortable, fatiguing and inconvenient, since it would necessitate constant movement of the head to cover anything like a useful field. In spectacles for distant vision a small field might be distinctly dangerous; the field must be sufficiently large to enable the wearer to move about in safety. He should be able to see that he is approaching steps, street crossings and other obstacles before he is right upon them. For reading it is desirable that the wearer should be able to see, at an average reading distance, a whole line of print of an average sized book, and also the neighbouring lines above and below.

The spectacles should give a useful amount of magnification, enough to assist the wearer and not so much that he will be worried by it. Magnification causes the image to move at a greater rate than the head or the object; if this magnified movement of the image is too great it becomes difficult to hold the head steady enough for comfortable observation, or to follow objects already moving at a considerable speed. Moreover, magnification varies inversely as the extent of the useable field of an instrument; for this reason too, the magnification must be kept as low as possible, since field is of great importance. It is fairly generally agreed from experience that $\times 1.3$ to $\times 1.8$ is the most desirable magnification to give. It is sufficient to give the patient the assistance he requires while it is low enough to afford a useful size of field having tolerable definition with a simple optical system. With this low magnification it is also possible to hold the head sufficiently steady.

Magnification will not as a general rule increase the brightness of the image on the retina. In Fig. 1*a* is given a diagram showing

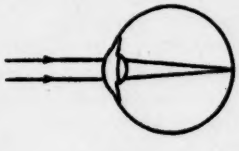

FIG. 1*a*.

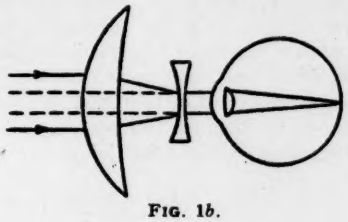

FIG. 1*b*.

the maximum diameter of a pencil of light, proceeding from a distant small source, which could enter a pupil of the size indicated. In Fig. 1*b* is given in broken lines the same maximum parallel pencil of light falling upon the eye. An emmetropic telescopic spectacle magnifying ×2 is drawn in front of the eye. Tracing the maximum parallel pencil of light from the eye backwards through the eye-lens and objective (see full lines) it will be seen that the pencil of light leaving the objective is twice the diameter of that entering the eye. In effect, therefore, the eye is receiving a pencil of light twice the diameter of its own pupil; *i.e.*, four times the area. Four times the quantity of light from a star would be imaged in a point on the retina. It should be realised, however, that this does *not* apply to extended objects which are diffusely illuminated, owing to the linear magnification. Certainly more light is received by the spectacles than by the unaided eye, but this larger quantity of light is spread over a correspondingly larger area on the retina. In fact, the brightness of the image per unit area on the retina is actually slightly less with telescopic spectacles than with the unaided eye, because of light losses through absorption in the glasses and partial reflections at the glass-air surfaces.

The spectacles should also have a large exit pupil to ensure that patients, whose vision may be feeble, are always able to use the full aperture afforded by the diameter of their own pupils. Moreover, in order that the spectacles may give all the light possible it is also necessary that the number of lenses should be reduced to a minimum, likewise their thicknesses and the number of glass surfaces exposed to air. Every glass-air surface diminishes the light entering by some 4 per cent. Further, these spectacles must be mounted quite accurately and rigidly before the eyes; this important question of mounting and fitting was dealt with at some length in the previous paper on the subject,* and consequently will not receive further consideration in the present discussion.

The form of telescope selected is invariably Galilean, that is to say, a positive objective and a negative eye-lens separated by the difference of their focal lengths. There are several important reasons underlying this choice. Firstly, a Galilean telescope gives with only two simple lenses an erect image without the introduction of an auxiliary erecting system as is required with an all positive telescope. This is an important matter when both compactness and lightness of weight are essential. The Galilean telescope is not only compact because it needs no erecting system, but also because objective and eye-lens are separated by the difference of their focal lengths and not the arithmetic sum as in

* *British Medical Journal*, September 8, 1928.

the all positive forms of telescope. The Galilean form has a large exit pupil enabling the wearer to use the full diameter of his pupil even in twilight, when it may reach 7 mm. Telescopic spectacles have to work with an abnormally large field, comparable to that of a photographic lens rather than a telescope. For this reason again the combination of the positive with negative lens in the Galilean telescope is advantageous in securing a moderately flat field tolerably free from astigmatism. Further reference will be made to this matter of a flat anastigmatic field. For all these reasons mentioned it will be clear that the Galilean form of telescope is the most favourable.

It will be evident already that the optical designer has very little freedom of choice. The spectacles are required to have a flat, extensive, tolerably well corrected field, yet at the same time they have to be compact and light in weight. The magnification is roughly fixed. The maximum over-all length allowed is so short that the designer is practically forced to take that minimum. The magnification and the separation of the components fix their focal lengths, since:

$$\text{Focal length of objective} = \frac{F_1}{F_2} = \text{Magnification} = M.$$

and $F_1 - F_2 = \text{separation} = d.$

Let us suppose that the magnification is to be $\times 1.8$ and that the separation of the components is to be 10 mm., then

$$F_1 = 1.8\ F_2.$$
$$F_1 - F_2 = 10 \text{ mm.}$$
$$\therefore 1.8\ F_2 - F_2 = 0.8\ F_2 = 10 \text{ mm.}$$
$$\therefore F_2 = +12.5 \text{ mm.}$$
$$\therefore F_1 = +1.8\ F_2 = +22.5 \text{ mm.}$$

The designer is therefore free to choose neither focal lengths nor separation, nor a convenient scale. His only freedom is in the shape and nature of the glass composing the two lenses of given focal lengths F_1 and F_2. Certainly he has a limited choice of separation, but this is so restricted that it can hardly be called a degree of freedom.

Now let us consider what has to be achieved in order to secure the results required while keeping within these severely restricted limits. The spectacles have to work with a large field. The designer will therefore have to contend with all the aberrations of an optical system which are known as the Seidel aberrations and are five in number, namely spherical aberration, coma, astigmatism, Petzval curvature of field and distortion. In addition to these, the spectacles are to be used in ordinary daylight

composed of all the colours of the visible spectrum. They ought, therefore, to be as free from chromatic aberrations as possible. The five aberrations referred to are only the primary or first order aberrations. There are of course higher aberrations, secondaries, tertiaries, etc., but it is quite impossible, also unnecessary, to take these into consideration in a system of few components.

Aberrations of lenses can be varied in several ways. They each obey differing laws and for this reason the decrease of one aberration in a lens system does not necessarily lead to a decrease in others. In fact the reverse is frequently the case; the reduction of one leads to the aggravation of another. For this reason the correction of lens systems is often a difficult matter and except in the most complicated systems a compromise invariably has to be

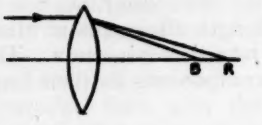

FIG. 2*a*.
Chromatic Aberration.

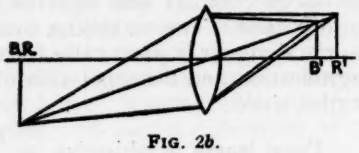

FIG. 2*b*.
Chromatic difference of Magnification.

made. The exact nature of the compromise is left to the discretion of the designer, and depends on the function of the system and the liberties afforded.

A very brief survey of the nature and effects of the various aberrations, and the method of eliminating them will be of interest in considering the problems connected with telescopic spectacles.

Chromatic aberration is due to the varying refractive power of glass for different colours of the spectrum. The axial image of a white star formed by a simple lens is afflicted with chromatic aberration, and is composed of a number of superimposed coloured images, each slightly displaced from the others along the axis. In Fig. 2*a*, "B" represents the focus of a ray of blue light, "R" the focus of a ray of red light from the same source, and the length BR is a measure of the chromatic aberration. The amount of the displacement BR grows with the square of the aperture of the lens. There is also another form of chromatic aberration, often known as chromatic difference of magnification (see Fig. 2*b*) causing the red light from a white extra-axial object to form a larger image than the blue light. This again is due to the fact that glass is less refractive for red light than for blue light. This chromatic error is very noticeable in instruments with a large field, such as telescopic spectacles, particularly along the edges of dark objects seen against a light background. The aberration can only be corrected by choosing

suitable dispersions for the glasses forming the various lenses. Further reference will be made to this matter.

Spherical aberration was mentioned as the first of the five Seidel aberrations. It causes rays of one colour from different zones of an aperture to focus at different points along the axis (see Fig. 3.) The distance " ab " is called the longitudinal spherical aberration and grows directly as the square of the aperture of the lens. That is to say, the aberration " ab " at an aperture of 4 mm. would be four times that at 2 mm. It causes images in every part of the field to look " fuzzy "; " soft focus " cameras are purposely given large amounts of spherical aberration.

Coma, astigmatism, curvature of field and distortion only afflict images away from the optical axis, and consequently they only

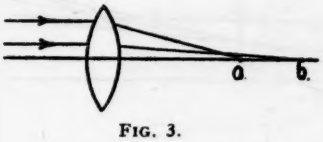

FIG. 3.

Spherical Aberration.

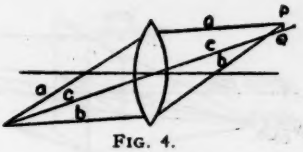

FIG. 4.

Coma.

appear in systems working with an appreciable field, *e.g.*, camera lenses, telescopic spectacles.

Coma was so called owing to the fact that a star image afflicted with coma was thought to resemble a head of flowing hair (Gr. *Κομη*); the word comet has the same derivation for the same reason. When rays pass obliquely through a simple lens the rays a and b (see Fig. 4) come to a focus on one side of the central ray c. The amount of coma may be measured by the distance pq. Coma, like spherical aberration, grows as the square of the lens aperture, but it also grows directly with the size of the field. There can be no coma at the centre of a field of a centred system, nor can there be any if the aperture be very small. That is to say, in telescopic spectacles there would be no possibility of spherical aberration if the patient's pupil were very small in diameter, and no possibility of coma if in addition, the field of vision were reduced to at most a few degrees!

Astigmatism, the most familiar, probably, of the primary aberrations, owing to its connexion with ophthalmic work, causes rays from one diameter of a lens to come to a different focus from those in other diameters, giving the same effect, in fact, as a spherocylinder. The rays are disposed so that two foci are formed, one being tangential to the field, the other radial. These foci are generally known as the sagittal and tangential foci respectively

(see Fig. 5.) The aberration called astigmatism in an ordinary lens-system differs from the familiar astigmatism of the eye in that it is zero on the axis and increases uniformly in every direction towards the edge of the field. The effect of this type of astigmatism is that *towards the outer parts of the field* point-images become elongated, either radially or tangentially to the field, as shown in Fig. 5. Astigmatism is measured by the separation between the sagittal and tangential foci S and T respectively (see Fig. 5.) Astigmatism in small amounts will not actually form linear images of point sources, but will elongate them; straight lines will be sharp in one meridian of the field at one of the astigmatic foci, and fuzzy in the meridian at right angles to it. In a mean meridian an average sharpness will exist. Astigmatism grows with the

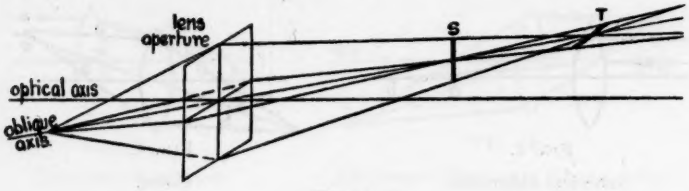

FIG. 5.

square of the aperture and the square of the field. That is to say, that it will grow rapidly with the increase of either. With small apertures and small fields it will be negligible. It is evident that astigmatism induces a certain curvature of field since the best compromise focus in the presence of astigmatism is mid-way between the sagittal and tangential foci.

Petzval curvature also grows with the square of the lens aperture and the square of the field. It does not affect the definition of images, but flat objects are rendered as curved images; flat walls appear concave or convex; the images towards the edge of the field are nearer to, or further from, the lens system than the axial image. Provided the difference of focus between the edge and centre of the field is within the observer's range of accommodation, he is able to see all objects in the field clearly defined, but the effect is not agreeable. If astigmatism as well as Petzval curvature is present the curvature of field will be modified. The position of the best focus in these circumstances is a debatable question, and its selection depends on the discretion of the designer in view of the nature and use of the system.

Distortion is another aberration which does not affect the definition of the image. It merely displaces an image from its correct position, towards or away from the axis; it will cause a

square object to appear barrel shaped or pin-cushion shaped. This effect is unpleasant. Distortion varies directly with the aperture but grows with the third power of the size of the field. A small reduction of the field will greatly lessen the distortion.

In addition to varying the apertures and field of a lens system, there are two important methods varying these oblique aberrations namely, by redistributing the curvatures, called " bending " the lenses, and by varying the position and size of the entrance pupil and exit pupil; the position and size of the entrance pupil controls that of the exit pupil, since one is an image of the other.

There are two ways of regarding the entrance pupil of a Galilean telescope: following the custom with ordinary telescopes it may

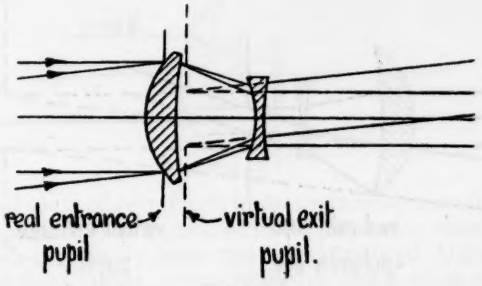

FIG. 6*a*.

be considered to be the cell of the objective (see Fig. 6*a*) in which case the exit pupil will be virtual, falling to the left of the eye-lens. This, of course, is an impossible position for the patient's eye. As it is the observer's own pupil which ultimately limits the pencils received from the system it is more reasonable to look upon the entrance pupil as the image of the exit pupil, the latter being taken as the observer's own pupil. It is not practicable for the pupil of the eye to be situated at a point less than 15 mm. from the eye-lens of the Galilean telescope, owing to the protrusion of eyelids and lashes beyond the cornea. We can accept 15 mm., therefore, as being the closest possible position of the exit pupil. Tracing suitable rays back through the system we find a virtual entrance pupil falling somewhere behind the exit pupil (see Fig. 6*b*). It should be noticed that the enforced position of this exit pupil necessitates very eccentric passage of the oblique rays of a large field through the system, an undesirable but equally unavoidable state of affairs. Here again we find that the designer is severely restricted. One of his most valuable means of controlling the aberrations is entirely barred; he is bound to accept an unfavourable position of the exit pupil and to do what he can by "bending"

the objective and eye-lens. He has no less than six aberrations to correct with only three degrees of freedom—the bending of each component and the choice of the relative dispersions of the glasses. His task would clearly be impossible were it not for one or two facts that have not yet been considered.

The pupil of the eye in average daylight does not exceed 4 mm. in diameter. This aperture of a parallel pencil at the eye implies with $\times 1.8$ magnification an aperture of about 1.8×4 or 7.3 mm. at the objective for individual pencils of light. The spherical aberration arising at this aperture, though exceeding the fine tolerances set for first class instruments, is unlikely to be really objectionable to the average wearer of telescopic spectacles. The

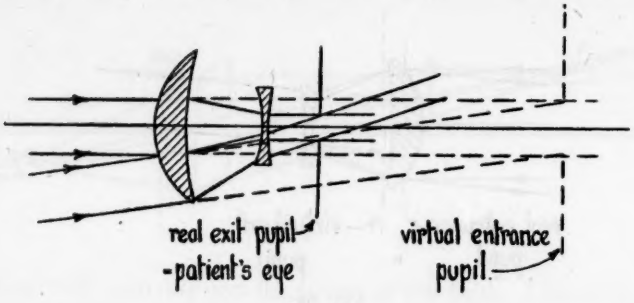

FIG. 6b.

axial chromatic aberration, too, will not be appreciable. The oblique aberrations, chromatic difference of magnification, coma, astigmatism, curvature of field and distortion remain to be corrected as far as possible by choice of glass and bending of the components.

Frequent reference has been made to " bending " of lenses. It is well known that a lens of given power can assume various shapes, plano-spherical, bi-spherical or meniscus, and that these forms can be mounted either way round in the instrument to which they may belong. It should be strongly emphasised that the shape of a lens has a very marked effect on all the aberrations.

It has already been shown that the powers and separation of the eye-lens and objective, and the position of the exit pupil are fixed within very narrow limits. The designer can still decide whether the lenses shall be simple or compound. The lightness of weight required rather prohibits the possibility of a doublet objective. A cemented eye-lens is possible and it must be decided whether the additional advantage gained justifies the increase in weight and expense. The chief benefit would fall to the chromatic difference of magnification; although the other aberrations would benefit to some very appreciable extent.

Whether or not simple lenses are selected, the chromatic dispersion of the objective, and the other aberrations arising, have to be balanced against those of the eye-lens. The choice of glasses for objective and eye-lens are of vital importance since the degree of freedom from colour in the image entirely depends upon this. In Fig. 1*b* it will be seen that a pencil of light entering the objective contracts very considerably before it meets the eye-lens; the objective is therefore working at a greater aperture than the eye-lens. Further, owing to the separation of the components the blue and red rays emerging from the uncorrected objective have widely diverged by the time they strike the eye-lens (see Fig. 7). The objective, if achromatism of magnification is to be obtained, needs

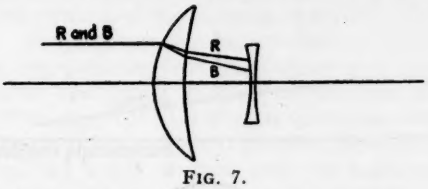

FIG. 7.

to be made of glass of very much lower dispersion than the eye-lens. Within the last 20 years a glass of lower dispersion than that of the crown glasses previously made has been produced. Using this new glass, called fluor-crown, in the objective and a glass of high dispersion in the eye-lens, it is possible to design telescopic spectacles having a tolerable degree of chromatic correction with two simple lenses.

As regards the indices of the glasses, a low refractive index in the positive objective and a high one in the negative eye-lens helps the curvature of field and astigmatism very considerably. It is a condition for freedom from astigmatism and curvature of field that

$$\frac{1}{F_1 \mu_1} + \frac{1}{F_2 \mu_2} = 0.$$

This equation is independent of the separation of the components of focal length F_1 and F_2 and refractive index μ_1 and μ_2. In order that this equation may approach zero F_1 and F_2 must clearly be of opposite sign, since μ_1 and μ_2 are inevitably positive. Further, if F_1 is larger than F_2, then μ_1 must be smaller than μ_2, in the same proportion. The construction of Galilean spectacles is therefore favourable. F_1 and F_2 are of opposite sign, and μ_1 of the objective is less than μ_2, F_1 the focal length of the objective being greater than F_2. This last discussion shows very clearly that the Galilean telescope, apart from considerations of compactness and lightness of weight, is much more suitable than the all positive

form. With finite and positive values of μ_1 and μ_2, also F_1 and F_2, the equation given above could not possibly approach zero. Very fortunately a glass of high dispersion also means one of high refractive index. The *most* favourable glasses for the eye-lens,

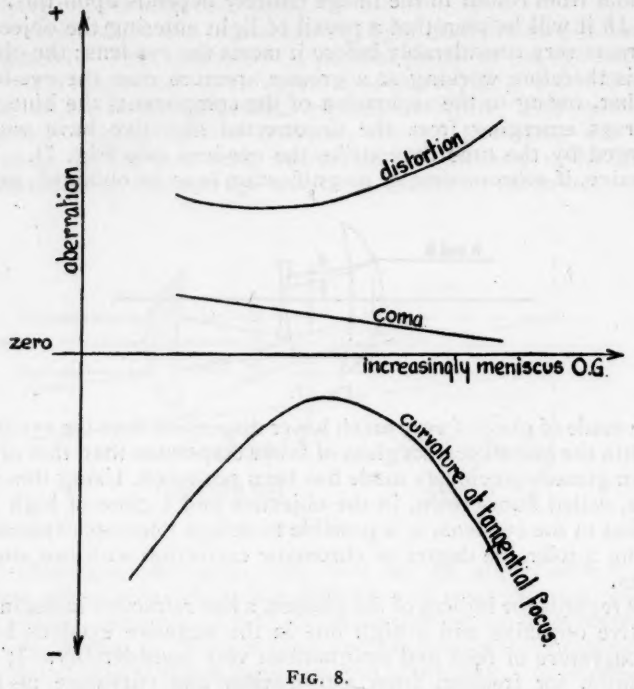

FIG. 8.

Bending objective effect on aberration in a particular case.

having highest dispersion and refractive indices, cannot be used because of their poor durability and low transmission of light.

Having selected the most favourable glasses, it only remains to find the best shapes of the two lenses. The simplest way of doing this is to trace suitable rays from the nearest practicable exit pupil through the system. By choosing three shapes of eye-lens and three shapes of objectives, a set of curves can be obtained expressing the change of the various aberrations relatively to the "bendings" of the lenses. It is very unfortunate that the aberrations vary at differing rates, and often oppositely. In Fig. 8 is shown a typical set of curves indicating the effect of bending an objective in a particular telescopic spectacle. It will be noticed that none of the aberrations indicated approach their minima together,

the coma is still falling when the curvature reaches a minimum. Also it should be noticed that the curvature, for instance, never does reach zero, neither does the distortion. The coma appears to be approaching a zero value, but as the curvature and distortion are growing very rapidly it would be useless to select the minimum coma " bending " even if it reached zero. A small amount of coma, probably unnoticeable by the average user, is much more tolerable than very heavy distortion and curvature. The designer must survey the whole series of curves he obtains, and knowing the relative seriousness of the various aberrations, he must choose those bendings of eye-lens and objective which seem to achieve the best compromise.

In a particular design it may quite possibly happen by good chance that the minima of the various aberrations occur very close to each other. If this is not so a little judicious variation of magnification, scale, separations, lens thicknesses and glasses may help appreciably after the best possible combination of bending has been chosen. The opportunities of such variation will, of course, be greater if the eye-lens is a cemented doublet, since a doublet consists of three curves, two kinds of glass and two thicknesses of lenses, instead of the two curves, one glass and one thickness of a simple lens. The doublet lens may be uncemented, in which case there will be further possibilities of varying the inside curves independently, also the air-gap between the units; in a cemented lens the inside curves are necessarily equal and the air-gap zero. It is, however, undesirable to have the components uncemented. It not only necessitates a more complicated mounting, adding weight to the spectacles, but it also lessens quite perceptibly both the amount of light and, what is really more important in these spectacles, the contrast in the image. Anyone who has done a little experimental photography knows the marked difference between the images produced by a lens consisting of a number of separated components, and by a single or cemented lens of the same focal length. The more complex lens may certainly give the better definition in the outer parts of the field, but it will not give the contrast, owing to loss of light at glass-air surfaces, and especially to internal reflections between the components producing a weak haze of what are really out of focus secondary images of the objects being photographed.

By following the methods very briefly indicated telescopic spectacles of a very respectable quality can be made for myopia, emmetropia and hypermetropia, also for reading. Myopic spectacles for distance vision have to be designed so that light entering the spectacles emerges from the eye-lens with the required degree of divergence corresponding to the myopia. Emmetropic spectacles for distance vision are pure telescopes, parallel light

entering and leaving the system. Spectacles for hypermetropia have to be provided with a positive power, so that parallel entering light emerges with a convergence corresponding to the hypermetropia it is required to correct.

Separate spectacles have to be provided for reading and distance wear.* This is rendered necessary because of the magnification of the spectacles; whereas 4D. of accommodation is normally required to read at 10 inches, something like 10D. of accommodation is required with the magnifying spectacles if the correction is placed behind the telescopic spectacle. As it is very inadvisable and frequently quite impossible for the wearer to exert this degree of accommodation it is necessary to supply him with special spectacles for reading. Another reason for the necessity of providing separate spectacles for reading and distance is that it is most important for the wearer to look axially through the system.* The P.D. and the angling of the frames has therefore to be different for different working distances. When reading spectacles are being specially designed, calculations must be made for light diverging from an object at the working distance. Strictly speaking a slightly different shape of the eye-lens and objective is required for every different condition of entering and emerging light. In practice it is good enough to have a series of spectacles, one for emmetropia, and perhaps one at every 10D. of ametropia. Intermediate degrees of ametropia can be corrected by giving the additional correction to the eye-lens or in a thin separate lens mounted over the eye-lens. It may or may not be found necessary to modify the designs for reading.

The foregoing discussion may possibly lead one to suppose that the telescopic spectacles are still very imperfect systems. Judged by the standard of first class photographic lenses, for instance, they certainly are not likely to be so good. But it must be realised that while the old telescopic spectacles were hopeless, a first class standard is fortunately unnecessary. The average untrained observer is not at all critical of definition provided it is moderately good. Moreover, the majority of wearers of these spectacles are incapable of critical observation owing to their own poor acuity and feebleness of vision. Such spectacles provided with a simple eye-lens are thought by many to be sufficiently good, if they be designed with care making the best use of the limited opportunities afforded.

At the beginning of the paper it was stated that surgeons had ceased to recommend telescopic spectacles to any except the excessively myopic, because the spectacles for emmetropia and hypermetropia were so poor. At the present time one firm (Theodore Hamblin, Ltd.) reports that it is supplying very many

* *British Medical Journal*, September 8, 1928.

more telescopic spectacles for patients who are approximately emmetropic than for those who are highly myopic. Patients with very poor vision are deriving benefit which fully compensates the inevitably greater weight of these spectacles. This fact seems to be ample proof that even if the spectacles are not perfect, yet they have been so greatly improved in recent years that now hypermetropic and emmetropic spectacles can be of valuable assistance. A further and more convincing indication of the practical value of telescopic spectacles is the frequent and successful use made of them by surgeons whose unaided vision is normally acute.

The practical adaptation of conditions necessary to obtain the best result in the use of telescopic spectacles may be a matter of considerable importance, as is shown by the following case, for the details of which I am indebted to Dr. H. W. Buttery. In it a simple manoeuvre led to an extremely valuable result.

The patient, an intelligent youth aged 18 years, used such spectacles for all near work, his vision being very defective as a result of some degree of microphthalmos and nystagmus. By this means he was able to read with ease and his progress was such that he was working for the entrance examination of a university. But he was grossly handicapped in mathematics, especially geometry, where he seemed quite unable to grasp the construction of figures. This affected him not only in his work but in his outlook on life on account of his inability to understand a wide sphere of common knowledge and interest. In other directions he felt no disability. It was obvious that the principal cause of his difficulty was the small field given him by his spectacles so that he was unable to obtain a conception of the figures and problems as a whole. Accordingly the procedure was adopted of getting him to learn the subject from figures much reduced in size but kept to scale.

By trial it was found that if each of the problems of Euclid were so reduced in size as to lie within one square inch he was able to get the whole figure within his field of vision. The legend of each problem was condensed into the adjacent square inch, so that with the least movement he was able to see the figure as a whole and the attached legend. He readily took to this method and made great advance in geometry and algebra, being able not only to see the figure but to write out at length over the page the proposition involved. As a wider issue this advance seemed to make him feel much less handicapped in life and better able to meet his fellows and converse with them in a normal manner. He was a very sensitive youth but this simple aid to his vision produced a most striking improvement in his mental outlook.

I have to acknowledge my indebtedness to Miss H. G. Conrady, of Messrs. Theodore Hamblin, Ltd., for much assistance in the preparation of this paper.

A CASE OF ATYPICAL COLOBOMA ASSOCIATED WITH ABNORMAL RETINAL VESSELS

BY

IDA MANN AND JAMES A. ROSS

LONDON CARLISLE

IN a paper on " Certain abnormal conditions of the macular region usually classed as colobomata," which appeared in this journal in March, 1927, an attempt was made to classify congenital defects in the neighbourhood of the posterior pole and to provide some diagnostic points by means of which a rough idea of the time of origin and the mechanism of production of the abnormality might be gained.

The anomalies were grouped into three classes (intermediate types also being known to occur), namely,

1. Pigmented macular coloboma.
2. Non-pigmented macular coloboma.
3. Macular coloboma associated with abnormality of blood vessels.

The various theories previously advanced to explain these conditions were discussed, and the balance of evidence was thought to be in favour of the occurrence of an ante-natal choroiditis as the determining factor. The varying appearances of the different groups were to be explained by the period of foetal life at which this occurred and by the superimposed aberrance of subsequent development which might or would ensue. The earlier the pathological process the more profound would be the modification of subsequent growth and the less would the end result resemble that of a post-natal choroiditis. Of the types of case described, the third (namely, that associated with abnormality of blood vessels) is by far the most rare, and it is in the belief that a further variant of this group has been found that the present case is published. In the paper previously referred to, three cases only were described under the third heading, and in two of these the vascular anomaly took the form of an abnormal vitreous vessel attached to the site of choroidal disturbance. In the third case, however, the anomaly was of a different nature and consisted of an anastomosis between retinal and choroidal vessels in the macular region.

Fig. I shows the appearance of the fundus in this case, which was originally described by Beaumont in 1891. It will be seen that the site of the macula is occupied by a circular white patch, resembling a second disc, in which the upper temporal branch of

FIG. 1.

Drawing, after Beaumont, of a macular coloboma showing abnormal anastomosis of vessels.

the *arteria centralis retinae* anastomoses with a choroidal vessel and with a tributary of the lower temporal vein of the retina.

The present case much resembles this, and obviously belongs to the same group. It differs, however, from Beaumont's case in that the coloboma is situated on the temporal side and somewhat above the disc, instead of at the macula, and that the upper temporal quadrant of the retina is supplied almost entirely by vessels from the coloboma and not by the upper temporal branch of the *arteria centralis retinae*. The case will now be described in detail and the possible embryology of the condition considered.

Clinical history.—The patient, J. R., aged 59 years (labourer), was seen by one of us (J.A.R.) complaining of "watering eyes" —a condition of long duration but worse recently. He is engaged in demolishing old houses and suffers from a catarrhal conjunctivitis of old standing, evidently aggravated by constant working in irritating dust.

R.V. = 6/9, with correction = 6/6.
L.V. = 6/12, with correction = 6/9.

Routine examination of the fundus revealed the condition shown in Fig. 2. The disc shows an unusual condition of vessels, the superior temporals being represented by a single threadlike vein. Up and out from the disc a pearly white cup is seen. Its margin overhangs, except to the lower half of its nasal side, where it is shelving. The cup is deep and from it emerge large vessels which supply the upper temporal quadrant of the fundus. Between the disc and the cup (or coloboma) the choroidal vessels are easily seen and the diminutive superior temporal vein anastomoses with them at two points at the nasal edge of the cup. No other anastomosis is found. There is some pigmentary disturbance (consisting of groups of faint greyish dots) here and there around the disc at a short distance from it and not particularly associated with the vessels. The macular area is stippled. Perimetry shows a normal blind spot and (apparently continuous with it) a scotoma corresponding with the coloboma. There is no sector defect and no defect in the area of the arcuate fibres. Colour vision is normal. There is nothing of interest in the patient's personal or family history.

The case, therefore, is one of note and, as far as we know, unique, in that a complete quadrant of the retina (the upper temporal) is supplied by a group of adventitious vessels appearing in the fundus through a localised defect in the retina and chorio-capillaris above and outside the disc.

Embryological Considerations (I.M.).—The question of the possible mechanism whereby such a condition might be produced is an interesting one. There is, we think, no doubt that the anomaly is a congenital one. The clear cut nature of the defect in the retina and the complete absence of any adventitious fibrous tissue, either on the retina or in the vitreous, and of all signs of present or recently past inflammation, preclude the possibility of trauma or post-natal disease, even apart from the vascular abnormality, which latter we feel assured can only be explained on developmental grounds.

The probable sequence of events in the embryonic life of this case appears to be as follows.

A patch of choroiditis (or choroidal disturbance of unknown aetiology) probably occurred, during the fourth month, above and outside the disc. Such a patch would involve the chorio-capillaris layer of the choroid and probably also the external choroidal layer (of tributaries of the *venae vorticosae*, which become recognisable by the third month) but would not necessarily destroy the intermediate layer (of branches of supply from the short ciliary arteries) which is only just beginning to develop at the posterior pole at four months.

The chorio-capillaris might be completely destroyed and the subjacent scleral condensation (at this period thin, cellular and soft)

FIG. 2.

Appearance of the Fundus in the present case.

might yield and become slightly ectatic. The overlying retina would also be involved to a certain extent. Its pigment layer and the membrane of Bruch (which appears at the 14 mm. stage) would be destroyed, since these are, from the beginning, closely adherent to the choroid.

The inner layers, however, might escape with much less damage, since they would be separated from the focus of disturbance by the potential cavity of the primary optic vesicle.

The rods and cones would probably suffer, but the layers internal to the external limiting membrane (and more especially the nerve fibre layer, already formed) would not necessarily be completely destroyed. This sparing of the inner layers would explain the absence of any sector-shaped field defect such as one would expect to find if the lesion had involved the whole thickness of the retina after the formation of the nerve fibre layer.

The lesion in the membrane of Bruch has removed the normal barrier which exists here between mesoderm and neural ectoderm and as a result it is quite possible for new arteries, developing from the intermediate layer of the choroid at the margin of the patch, to invade the overlying retina from its deep surface.

Such invading vessels would, at the end of the fourth month, find the retina prepared, if we may use the expression, to receive them, since it is at 100 mm. (16 weeks) that the *arteria centralis retinae* begins to bud out from the bulb of the hyaloid on the optic disc. The invading arterioles would spread peripherally in the retina and an accompanying system of venules and veins would appear *pari passû* beside them, just as the tributaries of the *vena centralis retinae* appear *in sitû* in the normal process of vascularisation.

If this process commenced at the temporal margin of the coloboma immediately before the appearance of vessels at the edge of the optic disc, then it seems reasonable to suppose that the normal development of an upper temporal branch of the *arteria centralis retinae* would be inhibited, since its area of supply would be already vascularised by the abnormal vessels. That this has occurred seems extremely likely from the appearance of the fundus (in Fig. 2) where one can recognise an abortive upper temporal vein which actually reaches the coloboma and anastomoses with a choroidal vessel in its floor.

The abnormal artery of supply is presumably one of the short posterior ciliaries and might be named a cilio-retinal artery, so long as it be understood that its development is not comparable with that of the usual cilio-retinal vessel seen at the temporal edge of the disc. In the case of this latter all that is required to produce it is the persistence of one of the anastomoses, so common in foetal

life and in the adult condition in many mammals, between the vessels of the choroid and of the optic nerve round the edge of the disc.

In the present case, however, there is a definite aberrance of growth, in that some abnormal process has destroyed the membrane of Bruch and allowed of an anastomosis between retinal and choroidal vessels in a situation where this never occurs normally in mammalian ontogeny or phylogeny.

The freedom of the rest of the eye from any abnormality and the clear cut nature of the defect, seem to us to point to a single localised lesion at a definite time rather than to any inherent failure in organogeny.

It is in the belief that the explanation can be found in a localised patch of choroidal disturbance occurring during the fourth month and that the case falls into the class of atypical colobomata associated with abnormal vessels that we venture to publish it.

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BUPHTHALMOS AND NAEVUS

BY

T. R. AYNSLEY

BOURNEMOUTH

I WISH to record four cases of buphthalmos presenting certain features in common. Two of the cases occurred in the course of my own work (E.R. and M.C.) and the other two I was able to examine at the Fountains Hospital.

Case 1. E.R., female, aged 9 years, imbecile. Extensive naevus on the face, scalp, left arm and left side of chest, also some patches on left buttock and thigh. The facial naevus has spread on to the right side of the face but at birth it was said to be confined to the left side. It extends on to the eyelids, but the conjunctiva is not affected. There is a right congenital hemiplegia and an X-ray plate of the skull shows a large calcified meningeal naevus (Fig. 1).

Left eye—cornea enlarged to about 13 mm. Anterior chamber deep. No thinning of the sclera. Some dilated episcleral veins. Pupil reacted sluggishly to light. The iris stroma appeared much denser than in the right eye and the colour was grey green, the other being light blue (Fig. 2). Optic disc large and deeply

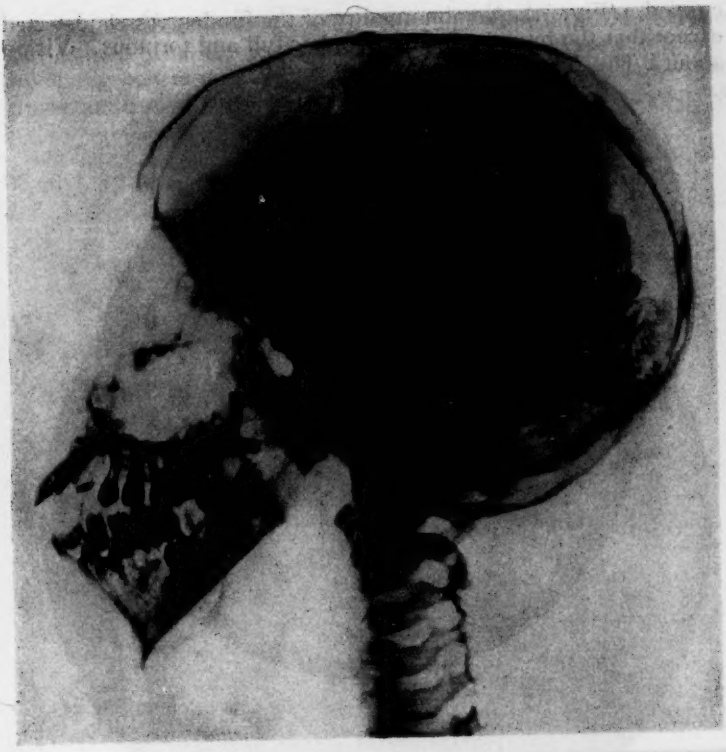

FIG. 1.

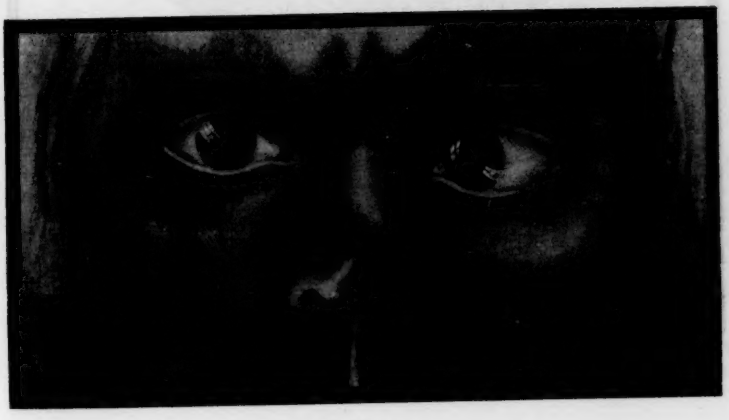

FIG. 2.

cupped. (Fig. 5.) No abnormality of the fundus vessels detected except that the retinal veins were rather full and tortuous. Vision about 2/60. The left eye converges slightly.

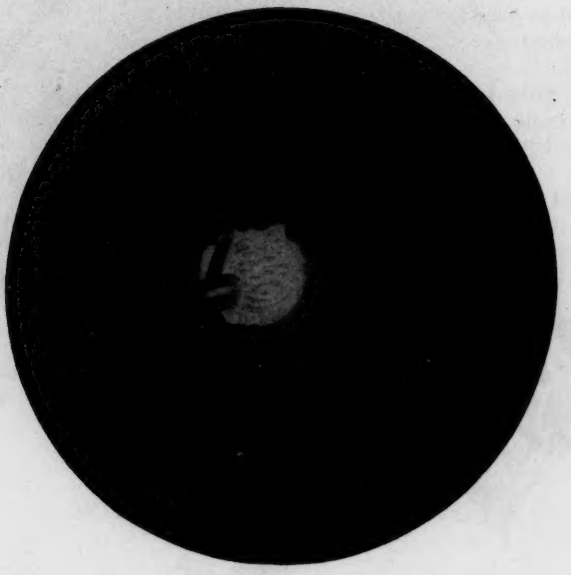

FIG. 5.

FIG. 3.

Case 2. M.C., female, aged 6 years, imbecile. A naevus covers the right side of the face and scalp, ending in the mid line and involving half of the tongue, palate, and mucous membrane of the upper and lower jaws. There is a left hemiplegia. An X-ray of

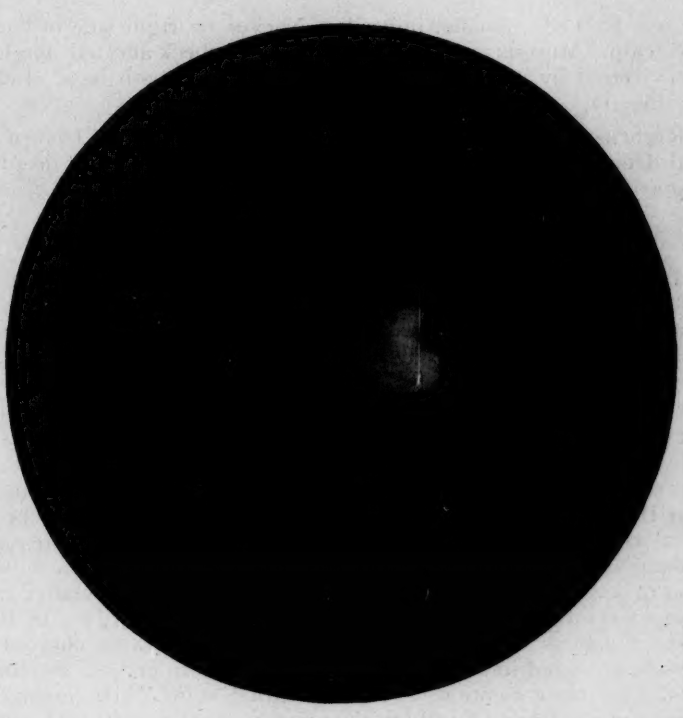

FIG. 4.

the skull shows a dark area above the cerebellum with a suspicion of commencing calcification in it.

Right eye—converges slightly. Is buphthalmic and the cornea is enlarged, but there is no thinning of the sclera. The iris has a dense stroma and is grey in colour, the normal side being blue. The disc is deeply cupped and appears atrophic. Vision, P.L. Tension full.

Case 3. B.G., female, imbecile. Naevus on both sides of the face, and areas on arms, back, and legs. Left hemiplegia. An

X-ray of the skull shows a circumscribed mass suggesting a calcified meningeal naevus, well marked in the cerebellar region.

Right eye—cornea enlarged about 13 mm., deep anterior chamber. Dense iris stroma darker in colour than normal side (Fig. 3). Optic disc large and deeply cupped. Retinal veins full and tortuous (Fig 4).

Case 4. D.T., female, imbecile. Naevus on right side of face and scalp. Mucous membranes of gums and cheek affected. Right arm covered by naevus. Areas on back and on both legs. Left hemiplegia.

Right eye—cornea enlarged, deep anterior chamber. Iris grey and dense in structure compared with normal side. Disc deeply cupped, especially on temporal side (coloured plate).

The first case of glaucoma in association with facial naevus was published by Schirmer in 1860. About thirty cases have since been described. There appear to be two main groups, those in which a condition of hydrophthalmos is present at birth or arises early in life, and those in which acute or chronic glaucoma occurs in later life.

On account of the fact that many cases of facial naevi do not have glaucoma there have been differences of opinion as to whether the two conditions are in any way causally connected. Elschnig and Beltman think that a vascular change is present in the choroidal vessels similar to that in the skin, and that the increased volume of the vascular bed of the eye leads to increased transudation of serous fluid, both factors tending to produce a relative incompetence of the drainage mechanism. Salus describes, in his case of naevus with glaucoma simplex, broad twisted choroidal vessels arranged in stellate formation in the periphery of the fundus. Schirmer mentions " twisted retinal veins." In my own cases the globe has a faintly flushed appearance suggestive of some vascular engorgement but difficult to describe in detail and only noticed by comparison with the normal eye on the other side. The denser " sculptured " appearance of the iris and the consequent difference in colour from the normal side are very noticeable in all my cases. Knapp has described a case of glaucoma and naevus of the face in which microscopical examination of the iris showed it to be thickened and angiomatous. I believe that in these cases (and also perhaps in the related cases of *conjunctival* naevus with glaucoma) a similar vascular change might be found in the ciliary body and even in the choroid, either preventing the development of the canal of Schlemm or causing blocking of the filtration

Hamblin

angle. Choroidal angioma might not be detected clinically in the absence of lesions in the retina, but E. E. Henderson and others have described such cases associated with facial naevus. [While this paper was in course of publication a case has been described by Krause with varicose iris vessels, and " enormously enlarged " peripheral choroidal vessels.]

Some observers favour the opinion that the connection between facial naevus and glaucoma is accidental, and an expression of the fact commonly observed that several congenital defects may be present in one person. Marchesani argues that as a naevus is a disorder of the skin vessels it is improbable that the same elective disorder would attack a part of the vascular system derived from the internal carotid artery. This opinion would appear to be untenable in the face of X-ray and operative reports demonstrating extensive meningeal vascular changes, and I hope to show that it is probably in the cases where there *is* intra-cranial involvement that eye defects are likely to arise. Safar, on pathological grounds, also rejects the idea of a causal connection between facial naevus and glaucoma and believes them to be merely co-existent abnormalities due to disease of the germinal layers. In a microscopical examination of his own case he found the ligamentum pectinatum thickened and the canal of Schlemm imperfectly developed in places. Safar's view is probably not correct for all cases, for Duschnitz has described a case in a young patient in whom no hydrophthalmos occurred (as would have been expected if some old-standing structural abnormality had been present) but the optic disc was cupped and the tension 40 mm. It would seem more likely that a variable vascular rather than an architectural abnormality was present in this case.

However, there is no doubt that congenital abnormalities of the eye do *apparently* simply co-exist with facial naevi, though it is more likely that they have some common underlying cause. A. Fuchs has reported a case, and while this paper was in course of preparation interesting related cases have been described by Foster Moore, MacRae, and Thomson. The variety of cases is further increased by one described by Ginzberg in which glaucoma supervened in a congenitally abnormal eye with coloboma of the choroid. The tension was 60 mm. and the disc deeply cupped. A facial and episcleral naevus was present in this case. (There is a possibility that some cases have been described as glaucomatous cupping which were merely congenital anomalies of the disc, and vice-versa.)

Cases of angiectasia solely of the eyeball seem to require mention, such as have been published by Leber, A. Fuchs, E. E. Henderson and James (with glaucoma). Bar reports a case of glaucoma with

naevus of the eyeball, and in the fundus were seen numerous anastomoses between the venous areas. This condition appears to form a link between the cases I am describing and von Hippel's disease, the picture of which has been further elaborated by Lindau who in addition to retinal angiomata found similar tumours in the cerebellum; renal and pancreatic cysts, and suprarenal adenomata. In this respect a case recently described by Krause seems to form a true "missing-link," as in addition to buphthalmos and the evidence of cerebral involvement provided by one-sided spasms of the arm and leg, there is a liver enlargement thought clinically to be angiomatous.

In conclusion I would say that I have not had access to all the references on the subject, and in consequence may have overlooked some important points. Also that my own cases, partly for geographical reasons and partly on account of the almost insuperable difficulties of dealing with imbecile children, have not had as complete an examination as I should have liked. However, as an attempt to offer an explanation to cover the somewhat bewildering variety of cases I would express the opinion that facial naevus has in itself no causal relationship with glaucoma, but that where the general cause of facial and bodily naevi, either a toxin, or (as Unna suggests) slight trauma to the branchial clefts, acts to produce naevi of the cerebral vessels, then the mesoblastic structures of the developing eye may be affected. And this may lead either to imperfect formation of the filtration angle or canal of Schlemm, or to coloboma of the disc or choroid; or to a teleangiectatic condition of parts of the intra-ocular vascular system which may sooner or later, through growth, sclerosis, transudation, or haemorrhage lead to a disturbance of balance of the intra-ocular fluids and the production of increased tension.

I suggest with Parkes Weber and Foster Moore that cases of naevi (particularly fifth nerve distribution), cases of buphthalmos with facial or bodily naevi, and cases of von Hippel's disease should be examined by X-rays, *and neurologically* for the presence of intracranial lesions. A negative X-ray of the skull may simply mean that the meningeal naevus has not yet calcified. I append a table of some cases with various points in favour of intracranial lesions.

I wish to express my thanks to Dr. Brushfield for permission to examine his cases; to the Superintendent of the Fountains Hospital for allowing drawings to be made; and to Dr. J. L. Grout, of the Sheffield Royal Hospital, for his X-ray photographs and reports.

The drawing in Fig. 2 represents the condition present in all my cases and may be taken as their prototype.

EVIDENCE OF CEREBRAL LESIONS IN ASSOCIATION WITH EYE LESIONS.

Reporter.	Eye Exam.	Neurological Exam.	X-ray, etc.	Miscell.
Aynsley (1) ...	L. buphth.	R. hemiplegia	Calc. mening. naevus. Abnormal sella T.	Ment. def.
Aynsley (2) ...	R. buphth.	L. hemiplegia	Suggestive of mening. naevus	,,
Aynsley (3) (Brushfield's case)	R. buphth.	L. hemiplegia	Calc. mening. naevus	,,
Aynsley (4) (Brushfield's case)	R. buphth.	L. hemiplegia	—	,,
Brushfield ...	Angioma "L. sclerotic coat"	R. hemiplegia	Calcified mening. naevus. No sella Turcica	,,
Cushing ...	R. buphth.	L. hemiplegia	Necropsy. Naevoid meninges	—
Cushing ...	R. buphth.	Convulsions following intracranial haem.	Operation, vascular dura c adhesions	Ment. def.
Cushing ...	R. buphth.	L. hemiplegia	—	,,
Foster Moore ...	Coloboma L. disc	Right homon. hemiopia	Calc. mening. naevus	—
Macrae	R. "pseudo glaucoma"	L. arm and leg smaller than R.	—	—
Parkes Weber...	L. buphth.	R. hemiplegia	Calc. mening. N. Pit. fossa small	Ment. def.
Thomson ...	L. macrophth.	Paralytic attacks L. arm and leg	—	,,
Krause	L. buphth.	Convulsive attacks R. arm and leg	—	Retarded

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ANNOTATIONS

Ophthalmic School Inspection

The Annual Report of the Metropolitan Asylums Board for the year 1928-29 has a short section devoted to ophthalmic conditions. As is well known ophthalmic cases among the L.C.C. schools have been under the care of the Board since 1897, and for the past five years cases of interstitial keratitis have been able to be admitted to the White-Oak School at Swanley.

Cases are drawn from the Metropolitan area, but, also by agreement, from extra-Metropolitan Boards of Guardians.

" To meet certain difficulties which had arisen in connection with children under the care of the Guardians and said to have a tendency to ophthalmia, arrangements were made by the Board in 1913 for monthly inspections by a surgeon skilled in the recognition and treatment of ophthalmia, of children at the Central London District School. The objects of this periodical visitation are, first, the earlier recognition and isolation of infective cases and a reduction in the number of cases which might otherwise be attacked by the disease and have to be dealt with specially by the Board in its ophthalmia school, and, secondly, to avoid occupation of accommodation by certain cases of a mild nature which are curable in a few days at their own institutions by means of suitable applications." These arrangements have worked well and are being continued.

The reports of the visiting ophthalmic surgeon at the Central London District School, Mr. F. A. C. Tyrrell, and of the visiting ophthalmic surgeon at White-Oak, Swanley, Mr. M. S. Mayou, are included.

At White-Oak 226 cases were admitted during the year: these are scheduled under the following headings.—Trachoma, 24. Chronic conjunctivitis, 38. Blepharitis, 48. Phlyctenular ophthalmia, 76. Follicular conjunctivitis, 1. Corneal ulcer, 13. Muco-purulent conjunctivitis, 2. Interstitial keratitis, 24. 290 cases were remaining over from the previous year. Of the total the following numbers were discharged cured.—Trachoma, 61. Chronic conjunctivitis, 38. Blepharitis, 27. Phlyctenular ophthalmia, 76. Follicular conjunctivitis, 7. Corneal ulcer, 7. Muco-purulent conjunctivitis, 1. Interstitial keratitis, 28. One case absconded.

Mr. Tyrrell's report makes it clear that the periodical inspection at the Central London District School has resulted in a considerable reduction in the number of admissions to the Board's ophthalmia schools.

These results speak for themselves. If such are obtainable in the London area by regular school inspection, it is pertinent to ask why similar methods cannot be adopted outside the Metropolis?

We understand that the Council of British Ophthalmologists has approached the Ministries of Health and Education in this matter, and we hope that a satisfactory answer will be forthcoming in the near future.

The Wilmer Ophthalmological Institute

The William Holland Wilmer Ophthalmological Institute was formally opened on October 15 and 16, 1929.

The idea of founding a central eye institute in the United States, with Dr. Wilmer as Director, is not one of mushroom growth; for, as long ago as the year 1920, Mrs. Henry Breckinridge was instrumental in appointing the provisional committee to undertake the necessary spade work, which has culminated in what must be the most complete and up-to-date ophthalmological centre in the world.

In 1922 matters had advanced so far that a deed of incorporation was framed and passed for the purpose of "establishing and endowing, and, if necessary, maintaining and conducting an institution for the care, treatment and surgery of the human eye, as well as research in the field of medical science as it relates to the eye."

The Johns Hopkins Hospital, at Baltimore, was obviously the proper venue for such an institution; and early in January, 1925, the General Education Board of the Rockefeller Institute promised

half the sum of three million dollars, needed for the foundation, provided that the remaining half were raised by February 15, 1925. This was accomplished; and temporary quarters were at once found in the Johns Hopkins Hospital. By October, 1925, with 40 beds and a limited space for laboratories, the Wilmer Institute had begun work. Meanwhile work was proceeding on plans for the new building; and excavations on the site were begun on July 20, 1927. The building was completed in the autumn of last year.

To date, 4,500 patients have passed through the institute for diagnosis and treatment; and 2,125 major eye operations have been performed. Cases have already been referred from Latin-America and the Continent. Out-patient attendances this year show a large increase in number over those of last year. Henceforward the Wilmer Institute will serve as the eye clinic of the Johns Hopkins Hospital, and the ophthalmological department of the Johns Hopkins University.

During the past year Mr. Adolph Lewinsohn, of New York, has generously endowed a fellowship in connection with the Wilmer Institute.

Few better examples of team work can be conceived than the institute, for cases are not looked upon as ophthalmic entities, and all known methods of examination of the body as a whole, besides the eye, are undertaken, when necessary, on the spot; nor has the training of ophthalmic nurses been neglected, for Dr. Wilmer has started an ophthalmic nursing school which is admirable. Research is proceeding in such subjects as glaucoma, cataract, ophthalmia of horses and physiological optics; while the institute is equipped with a photographic and drawing department, a valuable library, chemical, bio-chemical and pathological departments, as well as a department for actino-therapy.

The dedication ceremony was performed by Dr. Joseph S. Ames, President of the Johns Hopkins University. Hofrat Ernst Fuchs, of Vienna, delivered an address, on the first day, on " The Development of Ophthalmology in Europe "; on the morning of the second day Dr. George E. de Schweinitz lectured on " Some Contributions and Phases of American Ophthalmology "; and at an afternoon séance, Sir John Parsons spoke on " Colour vision and its anomalies."

ABSTRACTS

I.—DISEASE OF CORNEA

(1) **Betsch, A.—Chronic filiform keratitis as a result of deficient secretion of tears.** (**Die chronische Keratitis filiformis als Folge mangelnder Tränensekretion.**) *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXX, S. 618, 1928.

Engelking, E.—Corneal and conjunctival changes following a deficient secretion of tears. (**Ueber Hornhaut und Bindehautveränderungen infolge mangelnder Tränensekretion.**) *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXXI, S. 75, 1928

Isakowitz, J.—Endocrine periarthritis and filiform keratitis. (**Die endokrine Periarthritis (of Umber) und Keratitis filiformis.**) *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXXI, S. 85, 1928.

(1) Wagenmann first mentioned a possible association of filiform keratitis with deficient lacrimal secretion; an opinion substantiated by Schöningen (*Klin. Monatsbl. f. Augenheilk.*, LXXIII, 208.). The present three papers bring forward additional confirmatory evidence.

Betsch's cases were both females. The first (53 years of age) had a diminished secretion of tears which was not stimulated by ammonia or pilocarpine, although the latter drug produced profuse perspiration and salivation: otherwise the eyes were normal. The second (46 years of age) showed a disturbance of salivation as well as of lacrimation, and suffered from periodic swelling of the parotid gland during menstruation. Both cases had the typical appearances of filamentary keratitis limited to the lower periphery of the cornea.

Engelking's cases were both males. The first (aged 25 years) had a cirrhotic tuberculosis of both lacrimal glands which left the eye-balls healthy. An operation was performed in which both glands and the neighbouring region of the fornices were removed, and a typical filiform keratitis developed almost immediately, the filaments being most numerous near the periphery. The sensitivity of both corneae was reduced and the epithelium showed numerous regions of infiltration and irregularity, with circular areas of defect. There was persistent circumcorneal injection and the conjunctiva was lustreless and injected. The conjunctival sac showed the slimy mucous secretion which usually accompanies a deficiency of tears. The course was chronic and uninfluenced by

treatment. The second case (aged 38 years) underwent an operation for empyema of the frontal sinus which was followed by ptosis, lack of upward movement of the globe, and by very severe pain. The severity of the pain led three years later to procedures for destruction of the first division of the trigeminal nerve, and five years later to the excision of the Gasserian ganglion. This was followed in a few weeks by complete insensitivity of the cornea and cessation of lacrimation. Corneal infiltrations occurred which were followed by numerous dotted defects and a large central ulcer: but no filaments were seen. The absence of filamentary keratitis is noted with the reservation that such a picture may have been present but had been overlooked. It is to be noted that excision of the Gasserian ganglion, although it limits lacrimation, does not inhibit the physiological moistening of the cornea: the complete dryness in the present case must have been due to a conjunctival condition caused by some factor unknown.

Hower (*Klin. Monatsbl. f. Augenheilk.*, Bd. LXXX. S.10, 1928), discussing filamentary keratitis, associates it definitely with rheumatoid arthritis. The above cases in no instance showed any rheumatic tendencies. **Isakowitz's** case occupies a somewhat intermediate position. The subject, a woman of 53 years of age, showed a typical picture of filiform keratitis. She had complete absence of normal lacrimal secretion which could only be elicited by stimulation with ammonia, and arthritis of both hands and feet which was attributed to an endocrine origin.

W. S. DUKE-ELDER.

(2) **Doyne, P. G.—A case of gold chloride tattooing of cornea of right eye (old I.K.).** *Trans. Ophthal. Soc. U.K.*, Vol. XLVIII, p. 86, 1928.

(2) **Doyne** has treated a small boy, whose right cornea was completely opaque and very disfiguring, by tattooing it with gold chloride. His technique is as follows. Under a general anaesthetic the position of the pupil is marked out by a 5 mm. trephine, the cut being made through the corneal epithelium and no deeper. The corneal epithelium within the trephine circle is scraped away, and a piece of lint cut to the size of this area is soaked in a solution of gold chloride 4 per cent., held in forceps, and applied to the area. The gold chloride solution is slightly acid, 0.5 c.c. of N/2 NaOH added to 5 c.c. of gold chloride solution. A drop of atropine and adrenalin is instilled and a pad and bandage applied.

The result was a great cosmetic improvement.

H. B. STALLARD.

(3) **Dami, D. (Geneva).—Haemorrhagic infiltration of the cornea. Keratohemia. (Infiltration sanguine de la cornée. Kératohéma.)** *Rev. gén. d'Ophtal.*, January, 1929.

(3) **Dami's** article on blood staining of the cornea, haemorrhagic infiltration of the cornea or keratohemia as the author prefers to call it, is based on two personal cases in the sense that these cases stimulated him to investigate the condition. But neither of these cases came to histological examination, so that in the end the article seems to resolve itself into a very good critical examination of the literature of this rare condition. It deals in succession with the history, including the author's own cases, the symptomatology, the aetiology, the histology of the infiltrate and the pathogenesis. Dami evidently holds that the author to whom we are chiefly indebted is Vossius who first recognised (*Archiv. f. Ophthal.*, Vol. XXXV, 2, p. 207) the haematogenous nature of the corneal infiltrate and established the presence of two varieties of pigment, the one giving reactions for iron the other not, namely haemosiderin and haematoidin. Admitting that the corneal staining is due to blood as proved by Vossius, and that the condition is always the result of trauma, the great difficulty is to determine how the infiltration gets into the corneal substance. Dami rejects the views of Czermak, Treacher Collins and Maghy that the infiltration takes place from the anterior chamber, and considers that it passes through the meshes of the sclero-corneal trabecular system. " Let us say that the traumatism, accidental or operative, brings about a sudden venous stasis at the canal of Schlemm and the anterior ciliary veins, or even a rupture of these vessels, and that there follows an extravasation of blood resulting in the diffusion of this blood into the cornea through the more or less relaxed meshes of the sclero-corneal trabecular system." Having given this opinion, the author finds himself obliged to explain why this infiltration of the cornea is so rare. He does it in this way:—" The traumatism, while indispensable, is not sufficient of itself to bring about the infiltration. The eye upon which it acts must fulfil certain conditions which render this impregnation possible. Among these conditions are the anatomical arrangement of this particular segment of the eye, varying as it does from one subject to another; the permeability of the sclero-corneal trabeculae, which itself depends, as we have seen, upon the state of contraction or relaxation of the ciliary muscle, and the ocular tension, which latter undoubtedly plays a prominent rôle in the mechanism of blood infiltration of the cornea." A bibliography of 28 names should be useful to those who desire to study this subject.

ERNEST THOMSON.

(4) **Reid, A. Christie (Nottingham).—Hypopyon ulcer of the cornea. A brief review of one hundred consecutive cases.** *Lancet*, July, 1929.

(4) **Christie Reid's** article is, in the opinion of the reviewer, rather too brief. Twice in the course of it " want of space " is referred to, though whether the space was limited by the editorial department or by the writer does not appear. Both the subject matter and the author's treatment of it are worthy of fuller consideration, a fact which is clearly recognized by Reid himself in the concluding paragraph. The statistical results are dealt with in the text and deal only with sectioned cases by the special method to be described below. "My sectioned cases fall into two groups—(*a*) those done before the fourteenth day from the date of onset, usually a trauma; (*b*) those on the fifteenth day or later. Of (*a*) 3 were lost, 11 bad, 5 fair, 14 good, total 33. Of (*b*) 6 were lost, 12 bad, 5 fair, 7 good, total 30. Thus 9 eyes out of the hundred were lost; but statistics of removal depend largely on the personal factor. . . . "

The author describes his general treatment of hypopyon ulcer which, perhaps, is not very far different from that of most other ophthalmic surgeons; it is the method of carrying out the section, when this is done, that presents the chief interest. The description of this demands transcription. " Under local anaesthetic (cocain) a small keratome incision just inside the limbus is made in lower part of the cornea into the anterior chamber. A modified Usher's spatula is then introduced, and on to it with a special semicircular knife (like an old-fashioned vaccination lancet) a vertical incision is made through the corneal substance, thus completing an inverted T. Both instruments are made by Messrs. Down Bros. and Weiss & Son. The first incision is best done facing the patient, the second from behind. Thus the lens is protected and complete control of the eye obtained by the spatula. The second incision may require two or three to and fro movements of the knife, but may be done by one sweep from centre to periphery. The advantage of this incision is not only its completeness but its accessibility for subsequent tappings if deemed necessary. The point of the crossing is easily made out even weeks after, and I have with the greatest ease broken in with a blunt instrument 12 days after the original incision. Evacuation of the pus is not essential; it sometimes flows freely, at others is sticky and thick. It should not perhaps be left in the wound as it is then likely to act as a wick to introduce infection. One, two, or more subsequent tappings at intervals of two or three days may be indicated."

The author, who deals with large numbers at the Nottingham Eye Infirmary, might well consider the writing of a more detailed article on this important subject at some later date.

ERNEST THOMSON.

(5) **Koby, F. E. (Bale).—Variations in the thickness of the cornea as seen by the slit-lamp. (Modifications de l'épaisseur de la cornée, vues à la lampe à fente.)** *Rev. gén. d'Ophtal.*, February, 1929.

(5) **Koby's** article hardly seems suitable for abstraction, but its objects may be mentioned. It deals with the variations in thickness of the cornea anatomically and under pathological conditions. Especially it concerns the use of the ocular micrometer and of the author's cylindrical lens which increases the height of the beam in such a way that an optical section of the whole cornea is obtained. Koby incidentally remarks that a German and an English writer (both named) have failed to acknowledge his priority in the use of this cylindrical lens, which he first described in February, 1925. Readers will find on page 137 of this journal for 1929 an abstract of a previous article by Juillerat and Koby on the thickness of the central parts of the cornea as measured in the living subject.

ERNEST THOMSON.

II.—MISCELLANEOUS

(1) **Coppez, H. (Brussels).—Ocular Chalcosis. (Sur la chalcose oculaire.)** *Arch. d'Ophtal.*, October, 1928.

(1) Cases of impregnation of the tissues of the eyeball by copper are uncommon; at all events the number in medical records is very limited. Priestley Smith's, Haab's, Ertl's and Goldziehr's cases are generally mentioned and a few others have been reported. Goldziehr, in 1895, proposed the term chalcosis.

In 1927 **Coppez** reported two examples to the Société franç. d'Ophtal. (*Bulletin de la Soc. franç. d'Ophtal*, 1927) and at the same meeting Bretagne, Baudot, and Florentin, communicated a case, with reference especially to the polychromatic aspect of the lesions in the iris and anterior chamber when examined by the slit-lamp. Coppez now brings forward another example occurring in a man aged 29, who was wounded in the left eye by a fragment of a cartridge-case. The fragment penetrated the cornea, iris and lens, causing much haemorrhage. The foreign body was localised by X-ray examination in the lower nasal part far back, and did not react to the magnet. A fortnight later the foreign body " as large as the papilla " was visible with the ophthalmoscope; it had a shimmering surface. The retina below it was raised forming a pocket and presented a characteristic greenish tinge. Six months

later the eye was excised consequent upon a severe attack of irido-choroiditis. On examination of the globe(besides the usual lesions of irido-choroiditis) an area of exudation surrounding the foreign body, measuring 4 mm. in diameter, was found : it had a definitely greenish colour. The retina was densely infiltrated and widely detached in the vicinity of the foreign body. The exudation around the fragment, and the adjoining parts of the retina and vitreous showed a definite reaction to tests for copper : the lens and iris did not react.

J. B. LAWFORD.

(2) **Zur Nedden (Düsseldorf).—The curative value of aspiration of the vitreous.** *Arch. of Ophthal.*, March, 1928.

(2) **Zur Nedden** has practised the operation of aspiration of the vitreous 300 times during the past year. Animal experiments have shown that lost vitreous is replaced almost as quickly as lost aqueous, so that there is no need to inject saline. This procedure is also inexpedient because it may lead to infection and because saline has not got the bactericidal and reabsorbent properties of newly-formed vitreous. The danger of provoking a retinal detachment is very slight because the vitreous in these cases is generally of fluid consistency, so that aspiration is accomplished without violent suction. The technique is as follows:—A record syringe is employed with needles having a calibre varying from 0.3 to 0.8 mm. The points are specially sharpened. Sterilisation is effected by immersion in mercury-oxycyanide solution (1/1500) followed by boiling. After cleansing the lids and conjunctiva, the bulbar conjunctiva is pulled towards the cornea and a puncture is made, either from below or from above, 5-6 mm. from the limbus in a radiating direction, so that the point of the needle is directed towards the centre of the vitreous. Suction must be effected without using force and if any difficulty arises it is best to stop and resume a few days later with a larger needle. Amounts varying from 0.2 to 0.6 c.cm. may be withdrawn according to the nature of the case. Laceration may occur in the scleral canal on withdrawal of the needle, to prevent which the author uses the split spatula, and with it, presses gently over the point of incision so as to retain the shape of the eyeball. After aspiration the tension is much lowered; the eye becomes hypermetropic 1.6 D. for every 0.1 c.cm. of vitreous removed, and the bulbar conjunctiva becomes "suffused." There are many indications for this procedure. In ectogenic infections of the vitreous 0.5 c.cm. may be aspirated twice daily, and this may save the eye from developing panophthalmitis. In traumatic haemorrhage, if no noticeable clearing has taken place in 8-10 days, 0.2 c.cm. of the vitreous should be removed, and in

2-3 weeks a further 0.5 c.cm. It is unwise to wait longer than 10 days before aspirating because the haemorrhage may organise into fibrous tissue. Sometimes the operation has to be repeated several times. In spontaneous haemorrhage, the procedure is often useful. "It is simply astonishing how a completely impregnated, perfectly opaque vitreous is cleared as early as the day following aspiration." The operation has also been practised in some cases of diffuse choroiditis in neuritic atrophy, and in irido-cyclitis, though the indications given by the author are somewhat vague; it should also find a place in the treatment of embolism of the central artery, and in glaucoma following contusion of the eye with or without dislocation of the lens. In high myopia aspiration is to be condemned on account of the risk of producing detachment of the retina.

F. A. W.-N.

(3) **Klein, Eva (Strasbourg).—Ocular lesions in the manufacture of artificial silk. (Les lésions oculaires dans les fabriques de soie artificielle.)** *Arch. d'Ophtal.*, November, 1928.

(3) **Klein** has had under observation more than 200 cases of an affection of the eyes (which she classes as a new occupational disease) occurring among the workers in factories for the production of artificial silk.

The patient is usually brought for assistance by a comrade or a relative, and states that while at work he was attacked suddenly by a sharp pain in the eyes. This was followed by severe lacrimation, flow of fluid from the nostrils and complete inability to open the eyes.

On examination the signs and symptoms are almost invariable. The lids, slightly red, are closed by intense blepharo-spasm: on attempting to separate them tears escape abundantly, and only after several applications of cocaine is it possible to examine the eyes. The ocular conjunctiva corresponding to the palpebral aperture is very red; punctiform haemorrhages are sometimes present. The cornea is grey, the superficial layers swollen; when examination by the slit-lamp is possible localised elevations of the epithelium are visible, "about the size of the head of a pin." The spots of raised epithelium subsequently become flattened, and numerous very small superficial erosions result; these sometimes coalesce leading to a large loss of surface. This stage is reached rapidly; Klein has found it present in patients seen 3 to 4 hours after the onset: in other cases, in which the initial burn is apparently more severe it probably constitutes the first stage. Recovery is usually rapid and complete. No involvement of the iris has been seen. The application of a pad and bandage and of a few drops

of atropine are all that is requisite. Recurrent attacks are not uncommon.

After careful investigation in the factory and some experiments on rabbits with the chemicals employed, Klein concludes that sulphuric acid and acid sulphate of sodium are the active agents. She is of opinion that the noxious agents reach the eye chiefly in two ways; by fine drops of the solutions which are scattered by the vibrations of the strands of silk from the machinery, and by contact of the man's fingers with his eyes. Attacks are more common among new employees; probably the older hands learn to avoid the possibilities of damage to their eyes.

J. B. LAWFORD

(4) **De Lieto Vollaro, A. (Milan).—Removal of a living cysticercus from the subretinal space near the optic nerve, with permanent preservation of vision and of a portion of the visual field. (Remarks on the phenomena of life in the parasite and on the possibilities and technique of the removal.) Estrazione di un cistercerco sottoretinico vivente, situato in prossimità del nervo ottico, con permanente conservazione del visus e del campo visivo residuali. (Considerazioni sui fenomeni di vitalità del parassita e sulla opportunità e tecnica della estrazione.)** *Boll. d'Ocul.*, Vol. VII, October, 1928.

(4) English ophthalmic surgeons have few opportunities of seeing cases of cysticercus. Probably the majority of them go through their professional lives without having seen such a case, yet this very full account by the director of the Ophthalmic Clinic in the University of Milan, **de Lieto Vollaro**, is of interest in its description of the evidences of the vitality of the parasite and of its shifting from one part of the globe to another, and, finally, of the technical details of the operation for its removal. The article concludes with a discussion of the different methods adopted for dealing with the cysticercus in the eye. The possibility of removal seems to be restricted to cases where the parasite is subretinal. When it is in the vitreous, the chances of removal are very poor and killing the parasite *in situ* mostly results in destruction of sight, if, indeed, it does not ultimately lead to the need for excision of the eye.

LESLIE PATON.

(5) **Collomb, A. (Geneva).—Voluntary nystagmus. (Nystagmus volontaire.)** *Ann. d'Ocul.*, Vol. CLXV, 1928, p. 427.

(5) **Collomb** reports a case of voluntary horizontal nystagmus in a man aged twenty-five years. The movements could be produced at any time, with a frequency probably of about two hundred

per minute. They were demonstrated most effectively when the eyes were converged as for a distance of ten to fifteen centimetres directly in front. A brother of the patient also had possessed the same faculty since childhood. Fifteen cases of *voluntary nystagmus* were found to be recorded in the literature, but in none of them was there any note of its familial occurrence. This brings the case into line with those of *ordinary familial nystagmus* of which a number have been described. Certain characteristics recur in the records of these cases. The nystagmus is horizontal except in one in which it is quoted as being rotatory (Barany). The vision is usually good, and objects appear to move synchronously with the movements of the eyes, as in miners' nystagmus. The muscular apparatus appeared healthy in the majority. Voluntary nystagmus is of central origin, depending on an action of the will, resulting in fatigue, and sometimes associated with contractures of other muscles—widening of the palpebral fissure, miosis and irregularity of the pupil, or spasm of accommodation.

HUMPHREY NEAME.

(6) **Barsan (Galatz, Rumania).—Intra-ocular cysticercus. Migration into the anterior chamber. (Cysticerque intra-oculaire. Migration secondaire dans la chambre antérieure.)** *Arch. d'Ophtal.*, November, 1928.

(6) **Barsan** reports one of the rare examples of cysticercus within the eyeball. The patient, a girl, aged 17 years, had been under the writer's care for an attack of irido-cyclitis of the left eye for which no definite cause was discovered; it subsided under local measures and the eye remained quiet for 2 months. Then the patient came again with symptoms of irritation of the left eye, and the presence in the anterior chamber of a lens-shaped cyst, white and translucent in appearance; on the side nearest the cornea there was a white opaque spot. The cyst was sharply defined, moved with the movements of the globe, but settled down towards the lowest part of the chamber. Examined by the corneal microscope the cyst exhibited characteristic features of the parasite and showed some independent movement.

The cyst was easily removed through a corneal incision; the eye made a perfect recovery.

J. B. LAWFORD.

(7) **Derby, George S. (Boston, Mass.)—The nature of so-called Koëppe nodules.** *Arch. of Ophthal.*, November, 1928.

(7) **Derby's** case occurred in a man of 43 years of age who had pulmonary tuberculosis and irido-cyclitis. The iris of the right eye was studded with many translucent (Koëppe) nodules which were on the pupillary margin, in the tissue running back to

the lesser circle and beyond. The lens was opaque, so it was decided to do a combined extraction, and the portion of the iris removed was submitted to microscopic examination by Dr. Verhoeff. He found the iris to be free from tubercles or lymphocytic nodules, its stroma being infiltrated with plasma cells but not otherwise altered. The nodules seen clinically on the anterior surface of the iris were also found to consist of plasma cells, many being somewhat atypical. Koëppe's nodules have been described in connection with tuberculous iritis, sympathetic disease, leprosy and so-called tropical syphilis. They are transient in character. In the author's opinion their presence is suggestive of a tuberculous aetiology; he has never seen them in iritis due to syphilis or to focal infection. The fact that they are composed of plasma cells is of no great significance, but is quite consistent with an early stage of tuberculosis, caused perhaps by the action of a toxin.

F. A. W.-N.

(8) **Gill, William (Washington).—A way to keep the eyelids closed after infiltration anaesthesia.** *Arch. of Ophthal.*, May, 1928.

(8) **Gill** describes a useful method for securing apposition of the lids after an intra-ocular operation when akinesis of the lids has been secured. The lids are very gently approximated. An applicator, wound round with cotton wool, is dipped into collodion and a drop of the fluid is applied to a group of the lashes of the upper lid at its midportion. When the small mass of collodion has become thick and adhesive it is gently pressed into contact with the lower lid by means of the applicator. The collodion will not adhere to the lower lid unless the skin is dry and the method is obviously inapplicable if the lashes have been cut short.

F. A. W.-N.

(9) **Thomas, F. (Gand).—Research on the absorption of experimental hyphaema. (Recherches sur la résorption de l'hyphaema expérimental.)** *Arch. d'Ophtal.*, May, 1929.

(9) The circulation of the aqueous humour and the paths of elimination of this fluid have been the subject of much study and experiment. Most of the substances introduced into the eye in such experiments are not free from the objection that they create artificial chemical and physical conditions which are liable to upset physiological processes. **Thomas** has endeavoured to meet this objection by introducing into the anterior chamber of the rabbit the blood of the animal itself; if this substance is unusual in the aqueous humour it is at least not foreign to the organism. In man

traumatic hyphaema, in the majority of instances, causes no disorder and undergoes absorption with surprising facility.

The blood is taken from the ventricle by means of a syringe with a needle of large calibre; a much smaller needle is then attached to the syringe and two or three drops of blood injected into the anterior chamber, the needle being passed through the sclera between the iris and the lens.

Soon after the operation the blood collects in the lower half of the chamber, and even if dispersed by sharp movements of the eye it quickly returns to that position. This observation may be repeated for two to three hours after the injection. Then from hour to hour the blood loses its fluidity, the red area becomes paler at its borders, while the parts nearest to the iris-angle become irregular and notched, indicating that at this point absorption is taking place. Soon two thirds of the blood have disappeared; that which remains is adherent to the anterior surface of the iris. Active absorption is finished; the blood on the iris undergoes slow absorption, its area becoming smaller day by day. Finally it is reduced to a red ring round the pupil, which disappears completely ten days after the injection, when the eye resumes its normal appearance.

Having carefully observed the naked eye changes in such an experiment Thomas proceeded to study the histological processes concerned in the absorption of the injected blood. His material consisted of 15 rabbits. Of the 30 eyes injected 10 were rejected owing to some failure in technique. The animals were killed by bleeding at intervals varying from 30 minutes to 9 days after the injection. Formol proved to be the most satisfactory fixing agent. The eyes having been removed a circular opening was made at the posterior pole, and the globes placed carefully in the solution: half an hour later the lens, sufficiently hardened, was removed by forceps, allowing the fixing fluid to penetrate the anterior chamber freely. The specimens were imbedded in celloidin and in paraffin and cut in series.

The author records details of the examination of 9 eyes enucleated from half an hour to 9 days after injection. During his investigation he suspected the possibility of the presence of free iron, and consequently made careful tests for the detection of this metal with completely negative results.

His conclusions are:—Blood injected into the aqueous humour is evacuated exclusively by the anterior channels. Fluid at first, it is eliminated at the iris angle by the lymphatic sheaths along the anterior ciliary veins. Later, the blood having become coagulated adheres to the front surface of the iris. The blood cells penetrating the stroma of the iris are collected by the lymphatics of that structure and conveyed towards the angle where in their

turn they reach the perivascular sheaths. The presence of the injected blood is soon followed by the appearance in the base of the ciliary body and the deep portions of the iris of migratory connective tissue cells with large nuclei and a narrow margin of protoplasm, without inclusions. They do not apparently act as phagocytes except for cellular débris. They leave the eye by the same channels as the injected blood.

Two pages of photo-micrographs illustrate the histological changes described in the paper.

J. B. LAWFORD.

BOOK NOTICES

Ofthalmologioký Sborník. Papers read before the Third Congress of the Czechoslovak Ophthalmological Society, 1928. Published by the Society, at Prague, 1929.

This volume of 578 pages contains 39 papers. This brief notice is entirely dependent upon the short résumé, in English, French and German, considerately appended to a number of the articles. Trachoma appears to be an urgent matter in Czechoslovakia and is the subject of 13 communications. Bruckner describes his attempts to cultivate a virus by means of Noguchi-Cohen's and Kyozo's method but without any success. Leser has a long paper on the histology of trachoma which unfortunately lacks a résumé, but is furnished with an extensive bibliography. Gala, after a large number of experimental injections of trachoma-antigen as an aid to differential diagnosis, concludes that " there is no difference between the reaction in patients with trachoma and those with non-trachomatous disease." Chaulmoogra oil in the treatment of trachoma (Gala) is pronounced of no greater value than olive oil. Stastník has had encouraging results from the use of thio-sulphate of copper; Vujtech finds that Dakin's solution is of little value in trachoma.

A paper by Jirman entitled " An experimental study of automatism of the isolated iris in the cat and rabbit " is of interest, as is one by the same writer on the " Histological examination of the sympathetic system in the iris of the rabbit," in which he expresses the opinion that microscopic examination demonstrates the existence in the iris of ganglionic cells, unipolar, bipolar and multipolar, with processes in connection with nerve fibres. His method of experimenting was by the injection into the aorta of an albino rabbit of a 0.9 per cent. solution of Ehrlich's methylene blue. A long paper by Kurz on Xanthomatosis bulbi is based on 4 cases, two of which were examined histologically; 6 microphotographs (the only illustrations in the volume), accompany this article.

The condition results, according to Kurz, from disturbance of metabolism in the iris and ciliary body consequent upon inflammatory processes, or glaucoma of long standing, and bears no relation to the cholesterin of the blood-serum.

Other papers deal chiefly with the clinical features of cases of eye-disease, *e.g.*, dacryo-adenitis and " Gonorrhoeal Rheumatism " in blenorrhoea conjunctivae of adults, melano-sarcoma and metastatic carcinoma of the uveal tract, tuberculous interstitial keratitis, etc.

Bulletin of the Ophthalmological Society of Egypt. Cairo: Misr Printing Press. Vol. XXI, 1928.

The Bulletin under review contains the transactions of the Ophthalmological Society of Egypt during its twenty-sixth annual meeting, and shows the society to be in a flourishing condition.

The greater part of the transactions is concerned with the discussion of clinical matters and the exchange of experiences. Most of the research work comes from the Memorial Ophthalmic Laboratory at Giza, where R. P. Wilson and his associates appear to be making full use of the laboratories which have been conceived, planned and carried through by the energy and enthusiasm of the former Director of the Ophthalmic Hospitals of Egypt, Mr. A. F. MacCallan. Though the society does not draw its inspiration from one source only, borrowing freely from Vienna and Paris as well as from London, the dominant influence seems to be English, and this is perhaps to be explained by the fact that most of the ophthalmic surgeons in Egypt received their training in the various ophthalmic hospitals of that country, and these still bear and are likely to bear for many years to come, the stamp of their former director (and in many cases their creator too) whose name keeps on recurring in the discussions.

Trachoma is an everpresent and everpressing problem in Egypt and the Bulletin bears ample evidence to this fact, for in these transactions trachoma is a sort of King Charles' head. With the wealth of trachomatous material at their disposal oculists in Egypt can well afford to try every casual straw of modern therapy. Wilson reports favourably on the treatment of trachoma, especially of stages I and II*a* (MacCallan's classification) by chaulmoogra oil, a method of treatment introduced in 1926 by Mme. Delanoe and vouched for by Morax. Holding that whilst there is no relationship between trachoma and tuberculosis (as has been claimed repeatedly), Wilson does, however, believe that the corneal complications of trachoma are not infrequently grafted on a tuberculous soil. He was therefore led to try subconjunctival injections of a gold preparation in such cases and is impressed by their value.

In the matter of proof correcting the Editors have allowed far too many misprints to creep in.

NOTES

Death

WE regret to record the recent death of Harry Morgan Gilmour, of Ipswich. Qualifying from St. Thomas's Hospital in 1903, he worked as clinical assistant to the Central London Ophthalmic Hospital, and settled in Ipswich, as an ophthalmic surgeon, in 1923, succeeding to the practice of W. W. Sinclair. Mr. Gilmour was ophthalmic surgeon to the East Suffolk and Ipswich Hospital and honorary ophthalmic surgeon to the Harwich and Dovercourt Hospital.

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Appointment

ARTHUR L. MCCURRY, M.D., B.Ch. (Belf.), D.O.M.S., to be Assistant Honorary Ophthalmic Surgeon to the Leicester Royal Infirmary.

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William Mackenzie Medal

THE William Mackenzie Medal "for original work in Ophthalmology of outstanding merit," which has been awarded this year to Mr. W. S. Duke-Elder, of London, is to be presented at the Glasgow Eye Infirmary on the evening of Monday, December 2, at 8 o'clock. On this occasion Mr. Duke-Elder will deliver an address on "The Clinical Applications of the Newer Conceptions in the Physiology of the Eye."

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North of England Ophthalmological Society

AS already announced, Professor van der Hoeve will give three addresses under the aegis of this society, in January, 1930. The addresses will be given at 4 p.m. on each day: at Sheffield, on January 17, in the Medical Library of the University of Sheffield; at Leeds, on January 20, in the Lecture Theatre, Instructional Block, of the Leeds General Infirmary; and at Manchester, on January 21, in the Clinical Lecture Theatre of the Manchester Royal Infirmary. Tea will be provided each day at 3.30 p.m.

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International League against Trachoma

ON the occasion of the XIIIth International Ophthalmological Congress, J. van der Hoeve, President of the Congress, and E. Marx, Secretary, called a meeting, at which the representatives of the following States and cities were present:—Drs. van der Hoeve, Leyden; Jitta, Amsterdam; Lutrario, Rome; Emile de Grósz, Budapest; F. Wibaut, Amsterdam; Angelucci, Naples; Auerbach, Moscow; F. Avizonis, Lithuania; J. H. Beaumont, New Zealand;

Birch-Hirschfeld, Königsberg; Coppez, Brussels; A. Feigenbaum, Jerusalem; Gray Clegg, Manchester; Hamburg, Roumania; Hanke, Vienna; F. Humbert, Paris; Imre, Pecs; Lundsgaard, Copenhagen; Lussich-Matkovics, Agram; Marquez, Madrid; S. Miyashita, Japan; Morax, Paris; M. Makashima, Japan; J. Park Lewis, Buffalo; C. Pascheff, Sofia; Pavia, Buenos Ayres; V. Rossi, Naples; Soria, Barcelona; Szymanski, Warsaw; Charles Weiss, U.S.A.; Wilder, Chicago; R. E. Wright, Madras; and M. Zachert, Poland.

"The spread of trachoma and the necessity of the campaign against it" was set forth in an exhaustive report by Drs. Lutrario, Rome, and Jitta, Amsterdam, delegates of the Comité d'Hygiène of the League of Nations, on the basis of official data, thereby complementing the reports on one of the chief subjects of the Congress.

The meeting resolved to form an International League, and in accordance with the motion of Dr. van der Hoeve, Dr. Emile de Grósz, University Professor, Budapest, was appointed as President, and Dr. F. Wibaut, Amsterdam, as Secretary, both being entrusted with the formation of a committee from among the delegates of the ophthalmological societies and leagues already in existence in order to elaborate the scheme of ways and means. The President was authorised to communicate with the Comité d'Hygiène of the League of Nations and the Rockefeller Foundation and to endeavour to enlist their aid for the movement.

FUTURE ARRANGEMENTS

1929

December 3.—Midland Ophthalmological Society, at Birmingham.

December 6.—North of England Ophthalmological Society, at Leeds.

December 13.—Section of Ophthalmology, Royal Society of Medicine. (Clinical Meeting.)

1930

January 10.—Section of Ophthalmology, Royal Society of Medicine.

January 17.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Sheffield. Subject: "X-ray Diagnosis in Ophthalmology."

January 20.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Leeds. Subject: "Strabismus."

January 21.—North of England Ophthalmological Society, address by Professor Van der Hoeve at Manchester. Subject: "Tumours and Pseudo-Tumours of the Eye and Orbit."

February 4.—Midland Ophthalmological Society, at Birmingham.

February 7.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

February 14.—Section of Ophthalmology, Royal Society of Medicine.

March 7.—North of England Ophthalmological Society, at Liverpool.

March 14.—Section of Ophthalmology, Royal Society of Medicine. (Clinical Meeting.)

March 28.—North of England Ophthalmological Society, at Sheffield.

April 1.—Midland Ophthalmological Society, at Wolverhampton.

April 2-5.—Ophthalmological Society of the United Kingdom, Annual Congress.

June 3.—Midland Ophthalmological Society, at Worcester.

June 13.—Section of Ophthalmology, Royal Society of Medicine. (Annual Meeting.)

July 10-12.—Oxford Ophthalmological Congress, at Oxford.

October 7.—Midland Ophthalmological Society, at Birmingham.

December 2.—Midland Ophthalmological Society, at Birmingham.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *October, 1929.*

BERENS, HARDY and STARK. Divergence excess.
GRADLE & MEYER. The blind spot.
FERREE and RAND. Intensity of illumination and other factors influencing the sensitivity of the radial test for astigmatism.
BROWN. The rôle of unlevel orbits in heterophoria.
MOTTO and ROWEN. Tuberculous dacryoadenitis.
ROY. Monocular blindness from light of electrical origin.

Archives of Ophthalmology. *September, 1929.*

DERBY. Personal recollections of Graefe, Arlt and Donders.
PILLAT. Does keratomalacia exist in adults?
GOLDSTEIN and WEXLER. The ocular pathology of periarteritis nodosa.
JUDD. Ocular lesions in tularemia. Report of two cases.
GIFFORD. Recurrent dermoid cyst. Successful treatment with trichloracetic acid.
GAGER. Hypertensive retinal diseases.
MAYER. Further visual results with telescopic glasses.
COWAN. The newer forms of ophthalmic lenses.
ALVIS. Amaurosis following ingestion of ethylhydrocuprein. Report of a case.

October, 1929.

DERBY. The International Congress of Ophthalmology.
PFINGST and SPURLING. Intracranial aneurysms : their rôle in the production of ocular palsies.
PILLAT. Does keratomalacia exist in adults ? *(Concluded.)*
VAIL, D. T., Jr. Oculoglandular form of tularemia.
TASSMAN and KARR. Glutathione in the crystalline lens.
KNIGHTON. Hereditary nystagmus. Report of a case.
WILLIAMS. Dermatoses of the region of the eye.
ABRAHAM. Retinochoroiditis juxtapapillaris—Jensen.
WOODS and BURKY. The relationship of the flavobacterium ophthalmiae to periodic ophthalmia in horses.

The Journal of Ophthalmology, Otology and Laryngology.

August, 1929.

MUNCY. The treatment of gonorrheal ophthalmia.
ROWLAND. Chronic purulent conjunctivitis from infecting prothesis.

Annales d'Oculistique. *September, 1929.*

ZAMENHOFF. On stereoscopic photography of the fundus oculi.
VASSUTINSKY. Concerning cataract extraction with suture.
SÉDAN. Temporary blindness from retinal angiospasm of malarial origin.
RIFAT. A case of spasm of the central artery of the retina.
RIFAT and MOUHIDDIN. Blindness following serous meningitis. Return of vision to normal after decompression.
DOLLFUS. Corneal tattooing with gold chloride.
JOURDAN. On a case of retinal oedema after electric shock.
FORTIN. Arrangement for seeing entoptically the blood corpuscles in the capillaries and the "houppes de Hardinger" using sunlight.
PACALIN. Simple procedure for anaesthetising the inferior portion of the lacrimal sac.
LODDONI. On a case of annular scotoma from quinine.

October, 1929.

UNGERER. The treatment of glaucoma by adrenalin.
BRUCKNER. Histological study of the permeability of the conjunctiva to tubercle bacilli.
BALDINO. The rational fixation forceps.

Archives d'Ophtalmologie. *September, 1929.*

TERRIEN. Ocular complications following the use of arseno-benzol derivatives.
FRENKEL and CALMETTES. On a case of unilateral internal ophthalmoplegia as the sole symptom of cerebral syphilis.
RENARD. The erysipeloid form of malignant staphylococcaemia.
TRANTAS. On the treatment of night blindness and keratomalacia by ingestion of liver.

Zeitschrift für Augenheilkunde. *October, 1929.*

REITSCH. Anatomical observations on the fornix, the caruncle and the plica semilunaris.
PURTSCHER. On an early symptom of commencing malignant growth in the choroid.
BÖCK. On a case of periarteritis nodosa with histologically proved changes in the ciliary muscle and ciliary vessels.
HAASE. A fatal impaling injury of the brain through the orbit.
REITSCH. Partially frosted glasses for binocular diplopia following paresis of the muscles.
LANGENDORF. Preso-iodide ointment in ophthalmology.

Archivio di Ottalmologia. *June, 1929.*

ANGELUCCI. On the aetiology of glaucoma.
ODISIO. On a case of syphilitic central choroido-retinitis.
ALAJMO. Direct laceration of the posterior lens capsule and circumscribed traumatic cataract by a seton.
FEDE. Serological research on blood serum.
GUERRA. Spring catarrh.

July-August, 1929.

——— Honour to Professor Angelucci.
——— Proceedings of the International Congress in Amsterdam.
GUERRA. Spring catarrh.

Lettura Oftalmologica. *August, 1929.*

GIANNANTONI. Contribution to our knowledge of dazzling by sunlight and electric light.
AGNELLO. Cysticercus in the anterior chamber. (Clinical and therapeutic considerations.)

September, 1929.

LODDONI. Granuloma of the iris. (Clinical contribution to pseudo-cyst of the iris.)
——— Gold preparations in ophthalmology. (Clinical experience.)

Revista Oto-Neuro-Oftalmologica. *July-August, 1929.*

LUNEDEI. Concerning a case of Quincke's oedema with bilateral hemiconjunctival hyperaemia and a case of hemi-urticaria.

Anales de la Sociedad Mexicana de Oftalmologia y Oto-Rino-Laringologia.

May, 1929.

JOSE. The medical treatment of ocular syphilis.
SILVA. Considerations respecting swimming bath conjunctivitis.

June-July, 1929.

JOSE. The medical treatment of ocular syphilis.

Archivos de Oftalmologia Hispano-Americanos. *September, 1929.*

BASTERRA. On complete extraction of senile cataract with capsular forceps.
GUIRAL Y VIONDI. Surgical treatment of glaucoma according to its type.
LUQUE. The syphilitic glaucoma patient.
POYALES. The simplified phakoerisis of Fisher.

October, 1929.

ARRUGA. Treatment of detachment of the retina.
LUQUE. The negative glaucoma patient.

Revista Cubana de Oftalmologia y Oto-Rino-Laringologia.

September-October, 1929.

RIVERO. Oxycephaly.
BRIONES. Statistics of one hundred cases of cataract operations.
AVALOS. A few words on two little known methods of treatment of spring catarrh.